

Application No.: 10/068,276

Docket No.: JCLA8191

**REMARKS****I. Present Status of the Application**

The Office Action rejected pending claims 1-13 and 29-39. Specifically, the Office Action rejected claims 1-10 and 29-39 under 35 U.S.C. § 103(a) as being unpatentable over Brooks et al. (US 6,084,297) in view of Scheller (US 5,866,949). The Office Action also rejected claims 11-13 and 37-39 under 35 U.S.C. § 103(a) as being unpatentable over Brooks et al. and Scheller as applied to claims 1, 8, 29 and 34 and further in view of Dordi (US 5,835,355).

After entry of the above amendments, claims 1 and 2 are amended. Hence, claims 1-13 and 29-39 are pending in the present application with claims 1 and 29 being the independent claims. Applicants believe that these changes do not introduce new matter and do not require new search. Thus, reconsideration of those claims is respectfully requested.

**II. Discussion of rejections****A. Rejections under 35 U.S.C. § 103(a) over Brooks et al. in view of Schueller**

The Office Action, at pages 2-11, item 2, rejected claims 1-10 and 29-36 under 35 U.S.C. § 103(a) as being unpatentable over Brooks et al. in view of Schueller. Applicants respectfully traverse the rejection.

To establish a prima facie case of obviousness, there must be some suggestion or motivation to modify the reference or to combine reference teachings, and the prior art reference

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(or references when combined) must teach or suggest all the claimed limitations. M.P.E.P. § 2143.

The Applicants' invention, as recited in the amended independent claims 1 and 29, is to provide a tape ball grid array package, having features that the tape has a dielectric layer having a patterned metallic layer and a patterned solder mask layer on *both sides of the dielectric layer*; that blind holes are formed passing through the second patterned metallic layer and the dielectric layer of the tape, and stopping at the first patterned metallic layer; that solder balls are planted into the blind holes with one end protruding outside a patterned solder mask layer over the second metallic layer; that the solder balls not only protrude above the solder mask layer but also *serve as an electrical medium* for connecting circuits on both sides of the tape; and that one or more solder balls are electrically connected to the second metallic layer in a manner that *the second metallic layer is circularly embedded in the solder balls*.

Regarding the independent claims 1 and 29, the Examiner states that Brooks et al. disclose a tape ball grid array package having substantially the entire claimed structure of the tape ball grid array as in claims 1 and 29 except the blind holes having an open end for inserting the solder balls. The Examiner further states that Schueller teaches a flexible ball grid array package having via holes and solder balls where the via hole has an open end such that the solder balls are inserted into the blind holes at the open end to provide the desired ground connection. The Examiner thus asserts that it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the blind holes as taught by Schueller to improve Brooks et al.'s package. Applicants respectfully disagree with Examiner's assertion.

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As mentioned above, claims 1 and 29 as amended provide that one or more solder balls are electrically connected to the second metallic layer in a way that *the second metallic layer is circularly embedded in the solder balls*. Such a feature is disclosed originally in Figs. 2G, 2H and 3 of the drawings. Brooks et al. apparently do not even teach that a solder ball is formed passing through a metallic layer. Schueller, on the other hand, does not teach the feature that a metallic layer is circularly embedded in a solder ball; in the specification, Schueller discloses merely that the solder ball is connected to the metallic layer (column 9, lines 25-7), and, in the drawings, Schueller does not disclose the “circularly embedded” feature in the drawings (solder ball 54a and metallic layer (conductive pad) 59b in Fig. 3B). It is noted that the “circularly embedded” feature of the present invention is a consequence of forming the via holes by a process of laser ablation or etching (claim 25), and that the feature is advantageous in that the solder balls can be more firmly hold by the metallic layer.

In the Response to Arguments in the Office Action, the Examiner asserts:

Brooks et al. teach the first and second metallic layers and respective contact element sites/pads being selected to provide the ground, power or reference' signal connections depending on application requirements through respective vias and solder balls (Col. 6, line 65 – Col. 7, line 10; Col. 5, lines 25-65). Therefore, Brooks et al. is combined with Schueller to incorporate Schueller's blind via configuration having inserted solder balls.

(Office Action, at page 15, item C). It is respectfully submitted that the present invention provides the second (lower) metal layer for ground/power connection and the first (upper) metal layer for signal connection, but that Schueller's solder balls are used for ground connection only (54a in Fig. 3B; column 9, lines 22-33), while Brooks et al. teach the

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upper metal layer (not the lower metal layer) for ground connection (column 5, lines 47-51). Moreover, as mentioned above, the way of connection between the second (lower) metallic layer and the solder balls is significantly different from that taught by Schueller. Thus, the combination of the teachings of the two prior art references does not create a structure with features of the present invention.

It is clear that Brooks et al. and Schueller, either alone or in combination, do not suggest all the claimed limitations. Therefore, for at least the reasons shown above and in the Applicants' response to the prior Office Action, claims 1, 29 and the claims dependent thereupon, are not obvious over Brooks et al. in view of Schueller, as considered as a whole.

Accordingly, for at least the foregoing reasons, Applicants respectfully submit that the grounds of rejection have been addressed and the rejection overcome. Reconsideration and withdrawal of the rejection are respectfully requested.

**B. Rejections under 35 U.S.C. § 103(a) over Brooks et al. and Schueller as applied to claims 1 and 8, and further in view of Dordi.**

The Office Action, at pages 11-14, item 3, rejected claims 11-13 and 37-39 under 35 U.S.C. § 103(a) as being unpatentable over Brooks et al. and Schueller as applied to claims 1, 8, 29 and 34, and further in view of Dordi. The Examiner asserts that it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the teaching of Dordi to improve the packages in Brooks et al. and Schueller. Applicants respectfully traverse the rejection.

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As discussed in the foregoing subsection, claims 1 and 29 and their dependent claims 8 and 34 are not obvious over Brooks et al. in view of Schueller at least for the reasons that the structures taught by Brooks et al. and Schueller are significantly different from that the claimed invention and that Brooks et al. and Schueller, either alone or in combination, do not suggest all the claimed limitations. Here, claims 11-13 are dependent on claim 8 which is in turn dependent on claim 1, and claims 37-39 are dependent on claim 34 which is in turn dependent on claim 29. Due to their dependency, even in view of Dordi, claims 11-13 and 37-39 are not obvious over Brooks et al. and Schueller as applied to claims 1, 8, 29 and 34.

Therefore, claims 11-13 and 37-39 are not obvious over the prior art references. Accordingly, for at least the foregoing reasons, Applicants respectfully submit that the grounds of rejection have been addressed and the rejection overcome. Reconsideration and withdrawal of the rejection are respectfully requested.

### **III. Interview**

A telephone interview has been conducted with the Examiner on October 23 and 25, 2003, after the issuance of the final Office Action. Certain issues relevant to Applicants' prior response and the Examiner's rejections in the final Office Action have been discussed.

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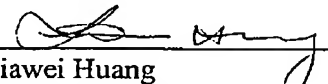
**CONCLUSION**

For at least the foregoing reasons, it is believed that the pending claims 1-13 and 29-39 are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

Date: 12/5/2003

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